

REMARKS

Claims 8, 12, 13 and 16-17 have been rejected as unpatentable over Davidian et al. '662 in view of Takashi Eiji '288 and Dynamit Nobel. Applicant respectfully traverses this rejection.

There is no element in Davidian et al. '662 which corresponds in any way to applicant claimed intermediate member 5 (claim 8) or connecting piece 5 (claim 16). In Davidian et al. '662, the headers 1 are shown attached directly to a housing 7 having corrugations 6. No intermediate member whatsoever is disclosed in Davidian et al. Only applicant discloses an intermediate member. Consequently, inserting a connecting piece is taught only by applicant's disclosure.

The Examiner recognizes this and attempts to cure this deficiency with Eiji '288, however, it is respectfully submitted that there is no disclosure of just how the steel member 4 and the aluminum member 5 of Eiji '288 are themselves held or bonded together. The Abstract of Eiji '288 merely states that the steel materials are joined to one another and the aluminum members are joined to one another, but there is no disclosure of how the steel material 4 and aluminum material 5 are joined to one another, other than being "so laminated" that they come into contact with one another. Appellant specifically recites that his aluminum piece 6 is explosively plated or bonded to his steel piece 7 so as to form an integral unit.

There is no teaching or suggestion anywhere in Eiji '288 that the plate comprised of the steel and aluminum members 4 and 5 could be used in a heat exchanger as an intermediate piece to bond a steel header to an aluminum housing or to a corrugated sheets of the heat exchanger. Clearly there is no motivation in either Davidian et al. '662 or Eiji '488 to combine them. Davidian et al. '662 does not recognize that it would be desirable to weld steel bent exchanger headers to a bent aluminum exchanger housings or corrugated core sheets. Eiji '48 does not suggest that the lamination of

aluminum and steel disclosed therein would be suitable for large, highly stressed structures. Only applicant recognized that a lamination produced by explosive bonding would be suitable to allow steel headers to be welded to aluminum housings and aluminum corrugated sheets instead of being otherwise attached thereto. As is set forth as follows in applicant's background of the invention at page 1, lines 19-27, the economic and technical benefits of being able to weld steel headers to aluminum housings and aluminum corrugated sheets are enormous:

The headers of the plate heat exchangers are often made of aluminum alloys having an increased strength compared to aluminum, but a relatively low strength compared to steel. At high pressures, therefore, only headers and supports with relatively small diameters can be used. To be able to heat or to cool large throughputs of mass under high pressure in aluminum heat exchangers, frequently several individual plate heat-exchanger blocks must be arranged in parallel. Even in the individual blocks under these conditions, double headers with several supports are, however, unavoidable. The design of aluminum plate heat exchangers is therefore very expensive in the case of certain flow criteria, especially under high pressures and at high flow rates.

If it was obvious to those skilled in the art at the time this invention was made, someone other than applicant would have made an explosively bonded laminate of steel and aluminum for use as an intermediate member in affixing steel headers to aluminum heat exchanger structures.

Clearly, the disclosure of Eiji '288 is deficient in explaining the bond between steel member 4 and aluminum member 5. This deficiency is recognized by the Examiner, and in an attempt to cure the deficiency, Dyanmit Nobel is added to the combination of Davidian et al. and Takahashi Eiji.

The Dynamit Nobel brochure has publication date expressed in German as "22-27.5.2000" which is "22-27 May 2000" or "May 22 to 27, 2000". The priority date of Applicant's German application DE No. 10022595.0 is May 9, 2000 which is prior to the May 22-27, 2000 publication date of the Dynamit Nobel article.

The Dynamit Nobel article does not suggest that the particular problem of welding steel headers to aluminum housings and corrugated sheets in heat exchangers can be solved by an intermediate piece in which an aluminum piece is explosively bonded to a steel piece. The only motivation to use explosive bonding for Applicant's purpose occurs in Applicant's disclosure. Explosive bonding as a technique has been known for years, but its use to solve the problems set forth on page 1, lines 19-27 occurred to no one prior to Applicant's invention.

Clearly, motivation for such a combination is applicant's disclosure not a suggestion in the prior art. The mere fact that the primary reference, Davidian et al. '662, may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. Davidian et al. discloses a heat exchanger but do not recognize the problem; Takahashi Eiji '288, recognizes applicant's problem of welding steel to aluminum, but does not offer a solution identified as suitable for heat exchangers, while Dynamit Nobel (whom applicant informed of the problem and to whom applicant told the solution) has a publication date after applicant's German prior application.

Claim 16 is also rejected as obvious under 35 USC §103(a) but relies on Showa Alum Corp '720A. Applicant respectfully traverses this rejection.

Showa Alum '720A discloses a heat exchanger having aluminum parts and a steel header, which is brazed thereto. Brazing is "soldering", which does not result in a very strong joint whereas welding results in a very strong joint useful for solving the problems set forth on page 1, lines 19-27 of Applicant's application.

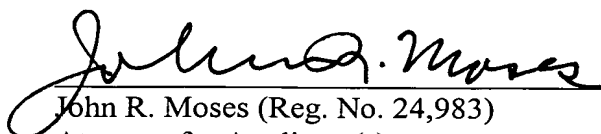
Recognizing this deficiency, the Examiner combines Eiji '277 and the Dynamit Nobel article with Showa Alum '720A. For the reasons set forth above with respect to Davidian '662, neither Eiji

'288 nor Dynamit Nobel cure the deficiencies of Showa Alum '720A.

In that this is a full and complete response to the Office Action of June 19, 2003, applicant respectfully requests that this application be passed to issue.

If the Examiner for any reason feels that a personal conference with applicant's attorneys might expedite prosecution of this application, the Examiner is respectfully requested to telephone the undersigned.

Respectfully submitted,



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